

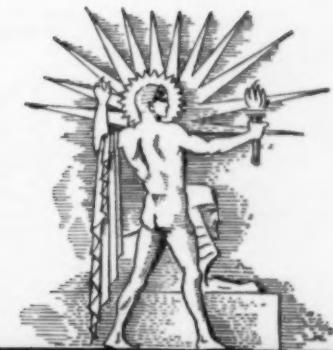
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NOV 13 1933 X

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 11, 1933

To My Lady in Her Bower

See Page 313

SCIENCE NEWS LETTER

VOL XXIV

No. 657

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Summary of Science

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DO YOU KNOW?

A new shell globe especially suitable for floodlighting low buildings has been produced.

There are a number of oil springs on the ocean floor off the southern California coast.

Government scientists announce "fair results" in growing vinifera or Old World grapes in the eastern United States.

Over six million oysters are set to work on the pearl farms of Japan each year, about sixty per cent. of them producing pearls.

Librarians who have wished for cast-iron covers to protect the books in their charge will be interested to find that copper sheeting is actually found suitable for covers subjected to hard usage.

In several Brooklyn hospitals, patients are diverted during operations under local anesthesia by providing them with earphones and playing phonograph records especially chosen.

If bottled milk stands in the sun, the sunlight may cause slight oxidation of the fat, giving the milk an "off" flavor.

Newly discovered gold deposits in the Belgian Congo are to be exploited during the coming year.

In about 26 years enforcement of the food and drugs act, the government has instituted court action against more than 40 so-called cancer "cures."

A naturalist says that African natives consider elephant meat a feast, but to a white man it is tasteless and most unpleasantly gummy to the teeth.

Porcelain enamel, once associated with kitchen equipment, is now being used for house shingles, the enamel being coated over steel and backed by asphalt-felting.

In 1930 about 16 per cent. of the Negroes in the United States could not read and write, as against more than 30 per cent. in 1910 and about 95 per cent. 60 years ago.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY

How did the Marksville moundbuilders bury their dead? p. 307. *Ancient Americans*—Emily C. Davis—Holt, 1931, \$3.50.

What famous modern skyscraper had a Roman ancestor? p. 311.

Who built the Chinese emperors' shrine to the earth goddess? p. 312.

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What American scientist has recently been honored in England? p. 312.

DEMOGRAPHY

Why is the average age of our population increasing? p. 314. *Population Trends in the United States*—Warren S. Thompson and P. K. Whelpton—McGraw-Hill, 1933, \$4.

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GENERAL SCIENCE

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HORTICULTURE

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What disease did convicts escape to win their freedom? p. 312.

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PSYCHOLOGY

Is print easier to read than typescript? p. 313.

PUBLIC HEALTH

Has the depression affected the weight of children? p. 315.

SOCIOLOGY

How old is a man when he is too old for a new job? p. 315.

ZOOLOGY

Do elephants become accustomed to air-planes? p. 312.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

ARCHAEOLOGY

Rosetta Stone of Prehistoric Mississippi Valley Found

Small Bowl and Other Louisiana Discoveries May Link Shadowy Mound Builders With Indians of Recent Times

DIGGING into an Indian mound at Marksville, La., archaeologists have found a "Rosetta Stone" of American prehistory, and evidence which may at last link the mysterious and shadowy Indian Mound Builders with Indian tribes of recent times. The discoveries are the result of a cooperative venture between the Smithsonian Institution, the city of Marksville, and the Emergency Relief Administration of Louisiana.

Frank M. Setzler, archaeologist of the Smithsonian Institution, has just returned from Marksville, where he directed the mound excavations at the city's invitation. Crews of 50 to 75 men drawn from the city's unemployed assisted in the project of exploring three Indian mounds and reconstructing them to their original ancient appearance. The mounds and a curved line of earthworks are features of a city park development.

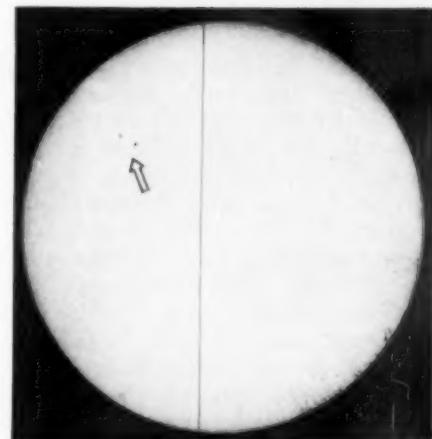
The object which Mr. Setzler likens to a Rosetta Stone is a small bowl of unusual shape and intricate decoration. The Rosetta Stone of the Nile bore the same inscription in known and unknown writing, and thus Egyptologists learned to read the hieroglyphics of Egypt. The Mississippi Valley's "Rosetta Stone" bears two kinds of art designs—known and unknown. One is the art style of the well-known Hopewell Mound Builder culture that flourished in the Mississippi Valley around Ohio. The other is an art style new to archaeologists. It had been seen on a few objects found in the South before, but it was like an unknown language, in that no one knew definitely what sort of people made such art or where they belonged in the prehistory of the South. Finding the known and unknown art combined on one bowl is pronounced convincing evidence that there was a southern variation of the Hopewell culture which existed contemporaneously with it and was closely allied.

The bowl almost looks as though the potter had made two generous halves of vases, each decorated in a distinctive

manner, and then had joined them in a twin form.

One mound explored by Mr. Setzler at Marksville was a burial mound, which originally contained some 30 graves. Parts of some skeletons, almost completely disintegrated, were found, and most of these were remains of young children.

The manner of burial was quite distinct from the tombs in Ohio's Hopewell mounds, Mr. Setzler found. A platform of clay was built by the Indians. After several years a pit was dug in the center for the graves. Then a vault of vertically placed logs was built around the pit and roofed with small oak limbs and layers of bark and wild cane. After that, the vault was covered by the mound to a height of 20 feet. Only the imprints of the logs and bark and other construction features remain to show the unusual construction of this ancient tomb. A few Mound Builders were buried in this central vault. Oth-



SUNSPOTS

This group of spots, indicated by the arrow, is the most important observed at the U. S. Naval Observatory in several months and may belong to the new cycle. This photograph was taken Oct. 29; the black line is a north-south marker.

ers were buried in shallow pits dug in the raised platform around the vault. In all cases the bodies had been placed upon and covered with bark.

The important vase with dual-decorations was found in this mound. Other contents included broken platform pipes, additional pieces of pottery with the southern and northern style of art design, and a single fragment of copper, perhaps a bracelet, which shows that these southern Indians like the Hopewell people had the cultural advantage of using copper. (Turn Page)

ASTRONOMY

Observations Show New Sunspot Cycle Begun

THE NEW cycle of sunspots has now begun.

Dr. Seth B. Nicholson of Mt. Wilson Observatory, Calif., has observed two spots opposite in magnetic polarity to the old procession of gigantic disturbances on the sun that have held sway for the past ten and a quarter years. This was announced by the Carnegie Institution of Washington, of which the Mt. Wilson Observatory is a part.

One spot was seen on the last three days of October, while another very small one was observed Oct. 10. It is now the time of sunspot minimum. The sun was nearly inactive in July and August, slightly active in September and

nearly inactive in October. The new family of spots now beginning will continue to troop across the sun's face for nearly eleven years.

J. D. Phenix, astronomer on the staff of the U. S. Naval Observatory, Washington, who photographs the sun about noon every day when the weather is clear enough, observed a group of spots near the solar meridian on Oct. 26, which were not seen Oct. 25. Following a parallel about eight degrees north of the sun's equator, they moved slowly toward the edge of the sun, at the same time dwindling in size, and appeared last in the daily photograph taken Nov. 1.

That the newly discovered Marksville culture may belong to the oldest of all the mound building cultures in the Mississippi Valley is the conjecture of Mr. Setzler. The objects seem older in type than those in the northern part of the valley. How old they may be he prefers not even to guess. Perhaps fifteen centuries old, he hesitatingly says, just to give a vague idea. From this southern center the Mound Builder culture may have spread.

Hope of setting in order the cultural events in the Mississippi Valley looks promising, Mr. Setzler believes, with Marksville yielding a very old Mound Builder culture that seems to merge into the famous Hopewell culture that moved north. And to carry the story on toward modern times, at another Louisiana site, James Ford, Mississippi archaeologist, has found the sequence of Hopewell culture, followed by what is known as Coles Creek type of culture, and in Mississippi by prehistoric Tunica Indian culture and then finally by Tunica Indians of historic times.

Efforts to link the Mound Building tribes definitely with known historic Indian tribes have heretofore yielded little satisfactory information. But now the line of heredity seems to be traceable, and by more scientific excavations in the southeast the tribes that evolved from these ancient Mound Builders will be known.

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METEOROLOGY

Chilly, Droughty Winter Indicated for California

CALIFORNIA is in for another winter with temperatures below normal and little rain. Thus Dr. George F. McEwen, Scripps Institution oceanographer, has interpreted the trend of weather-making factors off the West Coast, following his custom of the past several years, in which he has scored a high percentage of hits. He was right regarding both low temperature and scanty rainfall for the winter of 1932-33.

The coming winter is not expected to be as chilly as last year's, he says, though it will still be below normal in temperature averages. On the other hand, the precipitation trend indicates a drought even more severe than last season's. Values of seasonal precipitation, as he has calculated them, range from 60 to 85 per cent. of the average.

Science News Letter, November 11, 1933

ENGINEERING

Streamlining Saves Power Of 1933 Automobiles

But Most Rakish Current Model Still Has Twice as Much Air Resistance as Completely Streamlined Motor Car

THE AUTOMOBILE of 1933 consumes 30 per cent. less power in overcoming air resistance than its predecessor of 1928, wind tunnel measurements on models by R. H. Heald of the U. S. Bureau of Standards show. This improved performance comes as a result of the modern trend toward streamline form. The tests showed, however, that the air resistance of the 1933 car is still more than twice that of a completely streamlined car of the same frontal area.

The aerodynamic characteristics of six small scale replicas, ranging from one-quarter to one-fifteenth natural size, were studied in the wind tunnel at air speeds from thirteen to seventy miles per hour. These six models were a 1922 sedan, a 1922 touring car, a light sedan of 1928, and of 1933, and two models of the autos of tomorrow. The 1933 model was a composite model and not an exact duplicate of any actual make. It was equipped with disk wheels, exposed bumpers, fenders, headlights and spare tire. One model of the auto of the future differed from it in having the windshield inclined at a 45 degree angle, the top rounded front and rear, and a general smoothing of lines. The other model of the future presents a radical departure in design; the whole upper structure is rounded, blunt in front and tapered to the rear so that it resembles a section from a thick airplane wing. The wheels of this car are enclosed in the body.

Air Drag Devours Power

Mr. Heald measured the resistance offered by these models to air currents of known velocity and from this data he obtains the so-called drag coefficients which express the aerodynamic efficiency of the model. These coefficients ranged from 0.0017 for the 1922 sedan, 0.0018 for the 1928 sedan, 0.0014 for the 1933 sedan to 0.0005 for the ultramodern car of the future.

The significance of these figures can be more readily appreciated when these

drag coefficients are converted into horse-power consumption for an actual automobile. At a speed of 60 miles per hour air resistance devours 27 horse-power for the 1922 sedan, 33 horse-power for the touring car of the same period, 26 horse-power for the 1928 sedan, 18 horse-power for the 1933 sedan, and 8 and 6 horse-power for the two streamlined models. The slight improvement of the 1928 model over those for 1922 is due, not to any improvement in aerodynamic design, but to a reduction in frontal area, and to a lesser extent this is true also of the 1933 car as compared to the 1928 model.

At 48 miles per hour the power consumption due to air resistance is only half of that at 60 miles per hour while at 76 miles per hour it is doubled.

Great Saving at High Speeds

A very striking feature of Mr. Heald's results is the prediction that the 1933 automobile, shorn of its projecting bumpers, headlights, and spare tire, fitted with a sloping windshield and a rounded top, would consume 10 horse-power less at 60 miles per hour, and about 20 horse-power less at 70 miles per hour. The saving in gasoline would be of considerable importance for those who cruise at these speeds.

The completely streamlined, aerofoil type as represented in the most advanced of Mr. Heald's models, offers a further slight improvement in performance but this would only be of practical significance at considerably higher speeds. However, Mr. Heald points out that an automobile body of this shape would act like an airplane wing and at high speeds would produce a lifting force. The effect of this lifting force on performance has not yet been investigated.

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Carrying a refrigerator out into the field to the corn was the means adopted by scientists who wanted to study resistance of corn to cold in the field.



TELESCOPING TIME

The pot at the right contains specimens of winter oats from yarozized seeds; the control pot at the left contains plants from unyarozized seeds. Both were planted at the same time. Dr. Dmitry Borodin, who is trying yarozization experimentally in this country, is shown in the insert.

ARCHAEOLOGY

Iron Age Treasures To Be Sold in New York

THE "TREASURES of Carniola," a great collection of 20,000 bronze and iron objects belonging to the early Iron Age of Europe, have been shipped across the sea to be sold in New York.

The collection was amassed chiefly by excavating numerous tombs in the province of Carniola, Austria. The late Duchess Friedrich Paul of Mecklenberg sponsored this work for ten years, by a special license from the Emperor of Austria. The collection was her private property.

The early Iron Age in central and western Europe is scientifically known as the Hallstatt culture because it is identified with Hallstatt, Austria, where a cemetery of the age first came to light. The age lasted from about 900 to 500 B.C. and was notable because iron then came into use in commercial quantities. The graves of the people contain such things as swords and helmets, pins and other ornaments, glassware, household utensils, and farming implements.

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PLANT PHYSIOLOGY

Yarozization Process Turns Biennial Plants Into Annuals

Starting Germination, Then Chilling Seeds, Speeds Flowering and Fruiting; Widely Used in Russia

"**Y**AROZIZATION," a new seed treatment to speed growth of crops, is likely to be heard of a good deal in future because of American experiments now in progress. As a word, it bids fair to become incorporated in the English-speaking vocabulary of the plant sciences and the agricultural arts.

Yarozization is the treatment of seeds before they are planted, with the artificial regulation of certain natural plant growth factors: moisture, temperature and time. Each plant species, and within the species each variety and strain, has a particular combination of these factors to which it responds best, according to the practitioners of the new technique. Most interesting claims are made by the "yarozizers." They state that in Russia properly yarozized seeds produce plants that yield their harvest in much less time than do untreated similar seeds, making possible such things as the ripening of grain from winter-wheat seed sown in spring instead of autumn, the pushing northward of the cotton and corn belts, the speeding up of plant breeding experiments in greenhouses, etc. In the United States the process is as yet only in the experimental stage.

Invented by Russian

Yarozization, in its special sense, is the invention of a young Russian plant breeder, Dr. T. D. Lyssenko of Odessa. In this country, experiments with the new process were carried on last summer at the Arlington Farm of the U. S. Department of Agriculture by a Russian scientist, Dr. Dmitry Borodin, who is now in process of becoming an American citizen. His status in the Department of Agriculture was that of "collaborator." In his researches, he had the cooperation of numerous scientists at various experiment stations throughout the country.

To yarozize seed, it is exposed to a given degree of moisture, for a stated period of time, at a predetermined temperature. Each kind of seed has its own

"formula." Thus, to change winter oats from a two-season to a one-season crop, which is Dr. Borodin's outstanding accomplishment thus far, the formula reads: 50:28:2; that is, 50 per cent moisture (on the basis of the dry weight of the seeds), 28 days of treatment, at 2 degrees Centigrade above freezing. Then the seeds are dried, and in this state can be stored for a few days, or shipped to the place of planting. After planting, they mature their crop much more quickly than do untreated "control" seeds. Untreated seeds of winter grains—wheat, barley or oats—refuse to bear a crop during the first season after sowing, even if sown in the spring; but yarozized seeds out of the same lot behave just like spring grains, and mature their crop during the same summer.

Many Plants Yarozized

Dr. Borodin applied the yarozization technique to a great variety of plants at the Arlington Farm: winter barley, winter oats, corn, millet, sorghum, cotton and others, determining the "formula" for each.

Yarozization gets its name from the old Russian word for spring, "yar." When Dr. Lyssenko first performed his experiments, he thought of the process as something analogous to what happens in nature in the spring. Literally translated, then, the word might read "springification"; an attempt has even been made, mostly by research workers in England, to render it as "vernallization," but since it is now recognized that the whole process is not strictly analogous to that in nature, an Englishing of the word is now unlikely.

Like all "new" things under the sun, yarozization has had forerunners. As early as 1857, an American scientist, John H. Klippert of Ohio, discovered that larger and earlier grain crops could be secured by partly sprouting and then chilling the seed in darkness. He published an account of his researches, but the paper was overlooked and forgotten. Then, when Drs. W. W. Garner and H. A. Allard of the Department of Ag-



NOT BY ANY MEANS "THE LAST ROUNDUP"

The thundering herd shakes the plain again every year, when the Canadian managers of the great national herd of bison round up their shaggy cattle in the great Buffalo Preserve near Wainright, Alberta, preparatory to "cutting out" the surplus animals selected for slaughter and distribution as meat and hides.

riculture showed, a dozen years ago, that length of exposure to daylight has a great deal of effect on the flowering and fruiting of plants, more attention began to be paid to the general subject.

Working independently of the Russian experimenters, both in the U. S. S. R. and in this country, two other Department of Agriculture research men, H. H. McKinney and W. J. Sando, have developed a technique of pre-treating seeds by slightly germinating them and then chilling them in the dark for 50 to 65 days before sowing. They have been able to produce two or more crops of some winter wheat varieties in a single year by this method, which does not involve the development of such exact formulae for moisture, time and temperature as are called for in yarozization.

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HORTICULTURE

Apple Trees of World Number Half Billion

HERE are nearly 500,000,000 apple trees in the world, and of these the United States has approximately one-quarter.

A British Empire Marketing Board report points out that, though the numbers of apple trees in Britain, the United States and many parts of Europe have fallen considerably, there has been no decline in the average amount of fruit produced. In the United States, the reduction was by 100,000,000 between 1910 and 1930. The maintenance of production is due to the gradual rationalization of the world's apple industry, many countries having followed the example of America in growing apples in commercial orchards.

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GAME MANAGEMENT

Canada Kills 2000 Bison; Meat and Hides Marketed

BUFFALO meat will be available once more for homes, hotels and restaurants of this continent during November and December, following the decision of the Canadian Department of the Interior to reduce the government's buffalo herds at Buffalo National Park near Wainright, Alberta, by two thousand head. This wholesale slaughter recalls the settlement of the western country, when hunters and settlers wiped out nearly all the bison of the plains, killing more than a million of the animals in less than twenty years.

This year's slaughter is necessary because of the increase of the herd at Wainright to 7,500 head. There is only grazing room for about 5,000 animals at this preserve, where twenty-five years ago the Canadian government brought a nuclear herd of 716 animals. It is estimated that this original small herd has grown to 23,000 animals, including those moved to other preserves and those which have died naturally or been killed off for meat by the government.

Strictly up-to-date methods are used in preparing the 1933 bison for the meat market. The whole herd is rounded up annually and the animals selected for slaughter are separated in special corrals. The buffalo hunt of older days has been replaced by a modern abattoir and the animals are killed under the direction of inspectors of the Canadian Department of Agriculture.

In pioneer days, when countless thou-

sands of buffalo were killed, only the tongue and part of the carcass surrounding the hump were utilized for food. Modern slaughtering methods have made possible many other choice cuts from the American bison, and a variety of steaks, chops and roasts will be on the market marked with government inspection stamps.

Not all the buffalo meat will be eaten fresh. A number of the animals will be used to supply food to destitute Eskimos and Indians in Canada's far north. The meat is dried and shipped to the northern police posts, where the constables will distribute it to families in want.

In the West, buffalo robes and buffalo coats will be worn this year, for the hides of the buffalo are tanned. Modern fur-dressing methods have produced buffalo pelts superior to those which once were found in the homes of the early western settlers. And the Mounted Police will have new buffalo coats to wear on the Arctic trail.

Besides the herd of buffalo at Wainright, Alberta, the Dominion has small herds at other western game preserves and a herd of approximately 15,000 animals in Wood Buffalo Park, at the boundary of Alberta and the North West Territory, where a 17,000 square mile reserve is maintained for the buffalo. Nearly 7,000 buffalo have been shipped in recent years from Wainright to Wood Buffalo Park.

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ARCHAEOLOGY

Roman City in Britain Had Flatiron Building

A "FLATIRON" building, almost two thousand years older than New York's famous Flatiron, has been discovered.

Archaeologists digging in the ruins of the old Roman city of Verulam, not many miles from London, have brought to light this triangle shaped plan of a Roman temple. The building, which stood at an intersection of streets, is believed to have owed its wedge-shape to the same requirements of fitting a space that caused Broadway's Flatiron to be raised. Verulam's flatiron may prove unique among Roman temples.

Fragments of columns and other architectural remains offer some idea of the adornment of the temple. A central courtyard, opening off colonnaded corridors, contained a large altar and two statues. Cavities in the floor contained bones, chiefly of birds, and vessels used as containers of oil and other substances.

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GENERAL SCIENCE

Many Wisconsin Professors On Full-Time Research

WHAT may prove a new impetus in scientific research is seen in the announcement by the University of Wisconsin of a huge experiment under the terms of which 36 full-ranking professors will be relieved of all teaching duties for periods ranging from a year to a semester to devote full time to research.

It has long been the custom and practice in universities of this country to place the teaching burden upon the higher ranking members of the faculty, and, as a general rule, professors were forced to do their research in odd moments, and even more often, through assistants carrying out their orders.

This practice has been found to strengthen the teaching side of the university but it has weakened the research. Under the terms of the new experiment, the top ranking professors will be given full time to devote to investigation for a year, and then they will be returned to the teaching force while others go into research. This, it is hoped, will keep professors intimately in touch both with the scientific investigation field and with the domain of teaching,

a correlation that has sometimes been lacking in some American universities.

The experiment at the University of Wisconsin was made possible by the Wisconsin Alumni Research Foundation, a non-profit organization holding the patents on many discoveries made at the University by members of the faculty, and using the income derived from these patents to promote more research. Most famous of the patents held by the Wisconsin Alumni Research Foundation is the one on the Steenbock process, discovered by Prof. Harry Steenbock, by which the vitamin D potency of various foods and oils such as cod

liver oil have been standardized and raised by means of a process of irradiation with ultraviolet light.

The Alumni Foundation will finance the research of most of the 36 professors assigned to investigation under the terms of the experiment. The research will be in the fields of geology, soils, chemical engineering, plant pathology, anatomy, bacteriology, mathematics, mechanics, horticulture, astronomy, physiology, zoology, physics, genetics, poultry husbandry, chemistry, pharmacy, botany, history, sociology, economics, Spanish, and law.

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PHYSICS

New Low Weight for Neutron Discovered by Atom-Smashers

AMERICAN ultra-modern alchemists working at the destruction and creation of new atoms from old have found that one of science's newly discovered building blocks of matter called the neutron is much lighter than English physicists have measured.

Dr. Ernest O. Lawrence, addressing the Solvay International Institute of Physics at Brussels, told how he and his colleagues, Drs. M. Stanley Livingston and Malcolm C. Henderson of the University of California, have again used their whirling atom-smashing machine to pry into the hearts of atoms. Accelerating the hearts of heavy hydrogen atoms which are called deutons up to the enormous energy of 3,000,000 volts they have bombarded the rare light metal beryllium. A full report will be published in a forthcoming issue of the *Physical Review*, the American Physical Society journal.

These are the most energetic atomic particles ever produced by man and the most efficient atom-destroying bullets ever devised. These scientists scanning the results of the bombardment conclude that the beryllium disintegrates. Among the fragments flying out as a result of the explosion are neutrons. These neutrons are electrically uncharged particles similar to the hearts of ordinary hydrogen atoms called protons.

The California scientists say that the neutron weighs 1.0006 mass units. Prof. J. Chadwick of Cambridge University, England, last year said that the neutron

weighs 1.0067 mass units. This little difference in mass means an enormous difference in energy for it is from the transformation of mass into energy that modern alchemists hope to realize the Utopia of the future where all the energy necessary to run the world will come from the actual transformation of weight into driving power.

The crashing of the deuton bullets into the target of ordinary beryllium of isotope number 9 results in a transmutation of elements. Beryllium is changed into boron of isotope number 10 and a neutron. Assuming this to be the explosion that happens, the California physicists have calculated the new low value for the weight of the neutron, 1.0006 mass units.

Science News Letter, November 11, 1933

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SLEEP

an address by

Dr. S. W. Ranson
Professor of Neurology and
Director of the Institute of
Neurology, Northwestern
University

Wednesday, November 15,
at 4:35 p. m. Eastern Standard
Time over Stations of
the Columbia Broadcasting
System. Each week a prominent
scientist speaks over
the Columbia System under
the auspices of Science
Service.

ARCHAEOLOGY

Official Shrine of Chinese Emperors Found

AN OFFICIAL shrine where lofty emperors of China went personally to sacrifice farm animals to a pastoral Earth Goddess has been discovered by an expedition from the Freer Gallery of Art of the Smithsonian Institution. A report issued at Washington, D. C., says that the site was explored by W. J. Chang and K. Z. Tung, directed by C. W. Bishop, archaeologist of the Freer Gallery staff.

Abandoned for almost 2,000 years, the site of the shrine still has a reputation for the supernatural, and this awe of the place proved one clue that led to its scientific discovery. The shrine was in a sheltered recess at the foot of a rocky hill standing alone in a plain.

The shrine is believed to have been built about 113 B.C. by an emperor of the Han dynasty, Han Wu Ti. Early in the Christian era, the capital was moved and a new mound to the Earth Goddess was erected. So completely was the old shrine forgotten that the archaeologists found it only after tracking a number of false clues.

Excavations revealed bricks and tiles with Chinese inscriptions, stone knives, copper objects, iron arrowheads, and shell and bone implements. These are being studied by Chinese specialists.

Science News Letter, November 11, 1933

BIOGRAPHY

American Microbe Hunter Honored By Royal Society

DR. THEOBALD Smith of the Rockefeller Institute, Princeton, N. J., pioneer American microbe hunter, has been awarded the Copley medal of the Royal Society of London in recognition of his original research and observations on diseases of animals and man.

One of Dr. Smith's most notable achievements was the discovery that Texas cattle fever was caused by the bite of an infected tick. This work was done while he was with the U. S. Department of Agriculture in Washington. This discovery not only showed the way to prevent the fever which had been causing tremendous economic loss to the cattle industry, but pointed the way for the discovery that malaria is carried by mosquitoes and African

sleeping sickness by the tsetse fly.

Another of Dr. Smith's important contributions to science and the welfare of mankind was the discovery of the cause of bovine tuberculosis. He was the first to distinguish the bacillus of this disease from the bacillus of human tuberculosis.

Dog lovers all over the world will be glad to know that one of the two British scientists who discovered a vaccine for protecting dogs from distemper has been awarded a medal by the Royal Society. The recipient of the medal is Dr. P. P. Laidlaw, of the Medical Research Council. He is well known to scientists for his studies of viruses, the puzzling agents that cause diseases such as influenza and distemper which is thought to be the canine counterpart of the flu. Development of the distemper vaccine was made in collaboration with G. W. Dunkin under the auspices of the Field Distemper Council.

Science News Letter, November 11, 1933

ZOOLOGY

Elephants in Africa Bothered by Mail Planes

STORIES of the fabled Roc, the great bird of the Arabian Nights, that could pick up an elephant as a hawk picks up a hen, are recalled by the present plight of African elephants, which are very much annoyed by the overhead rush of airmail planes.

Capt. R. J. D. Salmon reports that the huge beasts' dislike of the noise of the motors has changed their habits completely, and caused them to seek new feeding grounds to the north and south of their former range. This in turn has brought some of them into contact with cultivated areas where they have damaged native gardens.

Unrest is spreading among the elephants. Until three years ago the majestic old bulls yearly mustered on the East Nile, but this has ceased. If the herds become more restless and insist on entering inhabited areas, reduction in the total number is inevitable.

Captain Salmon holds out little hope that the wild elephants will ever become accustomed to the noise of airplane engines. He observes that the trained elephants in the Belgian Congo never become really indifferent to the sound of gasoline engines, and it seems unlikely that the herds in Uganda will ever learn to browse peacefully as the airmail goes overhead.

Science News Letter, November 11, 1933



MEDICINE

Convicts Escape Disease And Win Freedom

TEN Mississippi convicts who risked their lives to aid science walked out of the state prison at Parchman, Miss., alive and free.

Their liberty was restored to them as reward for their heroic service to the society against which they committed their crimes. They furnished the proof with their own bodies that encephalitis, sometimes called sleeping sickness, is not carried by mosquitoes.

The proof enables scientists, seeking to protect society from the disease, to narrow the range of investigation and so to come closer to knowledge of how the disease is transmitted from the sick to the well.

Another group of convicts, volunteers from the Virginia state prison, are giving further proof that mosquitoes do not spread the disease. These men started to serve their sentence as human guinea pigs later than the Mississippi group.

Science News Letter, November 11, 1933

GENERAL SCIENCE

Exiled Jewish Scientists To Teach in Jerusalem

GERMAN Jewish scientists, deprived of their posts by the Hitler government, are being added to the staff of the Hebrew University at Jerusalem, Chancellor Judah L. Magnes announced. Prof. Adolf Fraenkel, formerly of the University of Kiel, will occupy a chair in pure mathematics in the Einstein Institute of Mathematics. Prof. Ludwig Halberstaedter of Berlin, who is now in Palestine, is slated to take over a new chair in radiology, the establishment of which is expected soon. Suitable candidates for Hebrew University posts in psychology, physical chemistry, physics, pharmaceutics, pathology and clinical chemistry, as well as for several new chairs in the languages and the humanities are being sought.

Science News Letter, November 11, 1933

ENE FIELDS

ORNITHOLOGY

Rare Bird Courtship Shown By New Museum Group

See Front Cover

ROMANTIC squires and young knights of the sunset days of feudalism paid court to the lovely ladies of their fancy in elaborately built bowers set in corners of the castle grounds. Even in these livelier days, when troubadours carry saxophones and steel guitars instead of plaintive lutes and melancholy citherns, secluded bowers do not come amiss.

But long before the first love-courts were held in the Languedoc, the bower-birds of the tropics were bowing and scraping and displaying their finery before their inamoratas, in elaborately constructed bowers which they built and brightly adorned, and they may be at it still after the last lad has ogled the last lass. The cover-picture of this issue of the SCIENCE NEWS LETTER, showing a new group mounted in the Field Museum in Chicago, is of a species of bower-bird from New Guinea. It is the habit of this species to use bright berries and fruits as ornaments for his dancing platform. When they wither, he carefully deposits them on a trash-heap, and replaces them with fresh ones.

Once the lady has accepted him, they set up housekeeping in a tree near by. But the bower is not abandoned. The male continues to use it for a play-room.

Science News Letter, November 11, 1933

PUBLIC HEALTH

Children's Weight Normal In Spite of Depression

THE WEIGHTS of American school children have not been materially affected by the depression, it appears from a survey made by Dr. Carroll E. Palmer of U. S. Public Health Service.

"There is substantially no change in the weight of boys and a slight increase in the number of underweight girls during the last few years of the economic depression," Dr. Palmer concluded from his findings.

"Inasmuch as body weight of the young and growing child is usually affected by severe nutritional deficiencies, it may be inferred that the nutritional status of children now is certainly not markedly below that which obtained during the preceding decade," he pointed out.

The survey was made among elementary school children of Hagerstown, Md.

Dr. Palmer suggests two reasons why the weights of Hagerstown children have not shown the effects of the depression. The first is the aid provided deserving and distressed families by a well-organized and highly efficient welfare agency such as Hagerstown possesses. The second reason is that in times of stress more attention may be given by the poorer families themselves to dietary matters.

Science News Letter, November 11, 1933

PSYCHOLOGY

Typewriter Script Read As Easily As Linotype

TYPEWRITER script can be read with almost the same speed and accuracy as the printed type produced by the linotype, Dr. Edward B. Greene found in tests conducted at the University of Michigan.

Students, in ten-minute tests, read the linotype a little faster than the typewriting when both were in 7-point size, but found the typewriting easier when in 10-point size, the "elite" size more commonly used in typewriters. The differences were so small, however, that linotype and typewriter script may be considered practically equal in legibility. It must not be assumed, however, that they would necessarily be equivalent for students not so advanced, for other kinds of type, or for longer periods of reading, Dr. Greene warned.

Both linotype and typewriter samples were arranged in double columns on 8½ by 11 inch sheets with an intercolumn space of about half an inch (15 mm.) All the samples were printed on a white, medium weight, bond paper in black ink without extra spacing between lines. The spacing between letters of the linotype material varied to fill the line and make the right margin even; spacing of the typewritten material was always the same and the right margin left uneven.

Science News Letter, November 11, 1933

PSYCHIATRY

New Clinic Treats Slight Mental Ailments

NEW HOPE for the patient who needs very brief treatment in a mental hospital is afforded by the new approach to the mental health problem exemplified in the new psychiatric clinic at the Boston State Hospital, Boston.

A commitment to a state hospital for mental disease is not the life sentence many people believe it to be. Nearly half, 45 per cent, of the patients admitted to the Boston State Hospital during a period of ten years remained only six months or less. Nineteen per cent, were there not more than 30 days.

The new clinic is designed to segregate these recoverable cases from those who are violent, infirm, or hopelessly ill. It also furnishes agreeable surroundings with private rooms, wide verandas, visiting rooms, and windows without bars. There are plenty of facilities for modern therapeutic methods, and also barber shop and hair-dressing rooms, cafeteria, and other provisions for the comfort and happiness of the patients.

The new clinic and its purposes are described by Dr. James V. May, Massachusetts Commissioner of Mental Diseases, in the Monthly Bulletin of the Massachusetts Society for Mental Hygiene.

Science News Letter, November 11, 1933

ENGINEERING

Diesel Powered Automobile Makes New Speed Record

A NEW WORLD'S speed record for diesel powered automobiles was made at London by Capt. G. E. T. Eyston at Brooklands track, traveling 102.86 miles per hour over a measured mile and 103.25 miles per hour over a kilometer. Despite heavy rain that necessitated nonskid tires, Capt. Eyston beat the previous record of 100.75 miles per hour created at Daytona, Florida, in February, 1931, by C. L. Cummins.

The engine has a 8.85 liters cylinder displacement and develops 130 horsepower from six cylinders. It was made by the Associated Equipment Company. Identical engines are used in many London omnibuses. Its total weight is only 1414 pounds.

The car is a comfortable fourseater saloon model with an entirely enclosed streamlined body.

Science News Letter, November 11, 1933

DEMOGRAPHY

Old Man's World

Fewer Young People, More Aged, Decreasing Population, Are Scientific Predictions for the America of 1980

By WATSON DAVIS

AMERICA, symbol of youth for the world, phenomenon among nations for speedy population growth, is becoming an old man's world.

Already its increase in population is slowing down, already there are fewer children being born and more old men and women living to ripe ages, reaping the benefits of a scientific world.

This old man's world which America is becoming will differ in many important respects from the America that we know. Careful planners for the future in business and government are taking the long look ahead to see whence our population is traveling.

Since Malthus, the British scientific prophet of a crowded hungry world, wrote over a hundred years ago, there have been many intensive studies of the populations of the earth, ranging from the comprehensive decennial U. S. census to detailed analyses of the effect particular factors have upon the rise of peoples. Malthus, who was really not quite so gloomy a prophet as he has been pictured, foresaw neither the effects of birth control nor the added fruitfulness of agriculture that was to come from the advances of science.

Population Research Foundation

During the past decade one of the most active centers of population research has been at Miami University, Oxford, Ohio, where the late E. W. Scripps, the newspaper publisher, founded a research inquiry into population problems. Drs. Warren S. Thompson and P. K. Whelpton consequently have been able to look into the future and to make scientific guesses as to what the censuses of future years will reveal.

This matter of population is more than a mere mathematical curiosity or a Chamber of Commerce pride in large numbers. The auto manufacturer who plans for the future decades must know whether he will need to make new cars to replace old worn-out ones only or whether there will be additional millions who will buy his product. Real-

tors want to know how many building sites their new subdivisions should contain. Educators need to know whether school and college enrollments will increase or decrease.

Uncle Sam's national family has grown enormously since he broke away from Britannia's apronstrings. From about 2,500,000 in 1776, the U. S. population has increased to over 122,500,000 in 1930, almost fifty-fold in little more than a century and a half. Since 1900 the population gained about 47,000,000 or nearly two-thirds as much as it did in the century and a quarter preceding.

Optimists reasoning loosely from the past, thinking with boom psychology, would deduce from this expansive past the idea that the U. S. A. will continue to increase in numbers of its citizens. Assuming that the numerical increase in the future will be about the same as it has been in recent decades, it is possible to arrive at the estimate that the population will be about 140,000,000 in 1940 and about 245,000,000 or about double today's population at the end of this century, 2000 A.D. More conservative is the logistic curve of Drs. Raymond Pearl and Lowell J. Reed of Johns Hopkins University which indicates a population of 185,000,000 in the year 2000 A.D.

But Drs. Thompson and Whelpton do not foresee such large increases in population in the course of this century. They set about 145,000,000 as the peak in U. S. population to be

reached in 1970. By 1980 the total population of this nation will be well on the down-grade in numbers.

The trends of birth, deaths and immigration, rather than the matter of the population change itself, are estimated in the Thompson-Whelpton prognostications of population. The births reached their peaks in 1921 and have been decreasing ever since then. The trend in deaths has been upward, the high point occurring in 1929. Net immigration has been lowered since the present quota laws went into effect and the additions to the country from the rest of the world are likely to remain at a relatively low level.

Population Will Decline

All of these factors point to a slowing down and a final actual numerical decrease in population. The birth rate has been declining for nearly a century and there is little reason to expect this movement to cease suddenly. While there has been a definite decrease in the death rates of persons in the younger age groups, particularly of children under one year of age, which has lowered the death rate in general and increased the expectation of life at birth, there is now a slight upward trend in the death rates at ages over 40.

Using such figures and their best scientific guesses, Drs. Thompson and Whelpton make the following predictions of future U. S. population:

1920 (actual)	105,711,000
1930 (actual)	122,536,000
1940	132,500,000
1950	139,800,000
1960	143,900,000
1970	144,600,000
1980	142,900,000

OUR CHANGING POPULATION

Age in Years	People in Each Age Group		Percent. in Each Age Group	
	1920	1980	1920	1980
0 to 20	43,633,000	37,300,000	41.0	26.1
20 to 50	46,328,000	61,600,000	43.6	43.1
50 to 70	13,378,000	34,500,000	12.6	24.1
70 and over	2,951,000	9,500,000	2.8	6.7
Totals	106,290,000	142,900,000	100.0	100.0

SOCIOLOGY

Young People Get the Jobs In This Old Man's World



DR. WARREN S. THOMPSON

If, as they estimate, population growth slows up and finally ceases within forty years, the adjustments in our national life that will be necessary make the depression and the N.R.A. campaign look like a sprinkle before a cloudburst.

American business has heretofore had an expanding market due to an increasing population. It promises to take longer to come out of the present depression because of the slowing population growth. In addition to increase of purchasing power aimed at by the N.R.A. effort and the other governmental actions since March 4, it will be necessary to abandon the old business idea of always planning for an increasing market. Instead, business campaigns of the present and future must be based on the idea of a population nearly stationary in numbers.

More important than decline in mere numbers is the decreasing number of younger persons and the rapidly increasing number of older persons that will come with America's population stagnation. Compare the population of 1920 with the probable inhabitants of the America of 1980.

The percentage of those in their prime of life, from 20 to 49 years of age will be almost the same, about 43 out of every 100 of the total population. But the youth below 20 in 1980 will constitute only 26 per cent. of the population compared with 41 per cent. as now. For every person from 50 to 69 years of age in 1920 there will be nearly three in 1980, increase (Turn Page)

ALTHOUGH older people are making up an increasingly large part of the country's population, their opportunities for getting work are not expanding to meet the need. On the contrary, restrictions upon the employment of persons past forty and fifty are tightening. The recent decision of the United States Civil Service Commission to restrict the examining of applicants for the stenographer-typist examination to those under 40 years of age is particularly significant because it is following, not leading, the practice of industry in this regard.

In 1930, when the depression years were just beginning, an official of the U. S. Department of Labor, pointed to the fact that employment was even then becoming increasingly precarious for women between the ages of 25 and 30.

"Paradoxical as it may sound, many a young girl of 29 in search of a job suddenly discovers that she is an old woman," she declared.

Employers of men as well as women have come to place a new value on intelligence, the eagerness of youth, adaptability to new ways, and training in modern schools. They are attaching less importance to experience, settled habits, dignity, and other attributes associated with older people.

Personality Important

Personality is also an important factor in the competition for employment. And the personality of youth is generally preferred to the personality of age.

A woman psychologist, who has done a great measure of productive research since she was retired from the faculty of her university because of age, has made a study of the objections employers make to aged people in industry. Here are the charges: They are too slow, too set in their ways, not inclined to learn the new, too talkative, too critical of both co-worker and employer, they lack initiative, and finally they are sensitive and inclined to feel always that they are being discriminated against.

Are these charges true? The psychologist, Dr. Lillian J. Martin, admits that in many cases they are. But the personality changes of age are not due

solely to the passing of the years, but to a mental slumping on the part of the aging individual and to the fact that the faults excused in youth become more objectionable in age. The talkative flapper is likely to be termed vivacious; the talkative woman of middle age is considered garrulous.

Old people do deteriorate mentally, it is true. But this deterioration is not nearly so rapid as has been thought. Differences between individuals at any age are more important than the differences between persons of 30 and persons of 40. Dr. Walter R. Miles, of Yale University, who has studied the waxing and waning of mental abilities of persons of all ages and all walks of life says:

"Age is usually one of the important factors which define physiological and psychological efficiency. No machine can last forever; action necessarily means the reaction of wear and tear. But there are distinct and measurable efficiency differences between individuals with chronological ages about seventy years, just as there are differences among people who are in their thirties or forties. The average for all who are older than 74 years, for example, may show a decrement of one-fourth to one-third from the general adult mean. But, on the other hand, one-fourth to one-third of these old people may still be as capable, in the functions tested, as the average adult, and to check them off just because they happen to have been born seventy or more years ago may be as unfair to the individual as to drop him because he was born of foreign parents."

Nevertheless, the problem is inescapable—what is to be done with people of the older age levels? It is undoubtedly true that there are not enough jobs for all, and that the younger men and women are preferred and should, after all, be given their chance to be financially independent.

But with the school period extended, and child labor laws gradually pushing up the age of first employment, man's productive years are being curtailed at both ends of life.

of from 12 out of each 100 of the population in 1920 to 24 out of each 100 in 1980. There will be some 6,500,000 more old men and women of 70 and over in 1980 than in 1920, a 1980 percentage of 6.7 compared with a 1920 percentage of 2.8.

Added to the economic troubles of a decreasing numerical population in 1980, there will be a world of more older people and fewer children. That is the kind of America in which our children and children's children must live. The changing age composition will bring innumerable changes, some of which are already being felt.

A More Conservative Nation

The United States will become a more conservative nation. Conservatism in government, business and other matters seems to increase after middle life. As the trend toward a nation of elders continues, the political parties will be more under control of older people, the average age of stockholders in corporations will increase and older men will run the businesses of the nation.

More culture and more support for the arts is foreseen in America's old man's world. Youth is concerned with forging ahead and making a place in the world, while later in life there is apt to be more reflection and interest in drama, music, science, painting, and the intellectual side of life.

As there will be about the same percentage of the population between the ages of 20 and 49 in 1980 as now, there will be little trouble in getting the physical work of the nation done since it can be done best during those ages. But the great increase in the numbers and percentage of those between

50 and 69, will create a great industrial and social problem. Employers do not like to hire those who have crossed the line of 50 years, or even those over 40 years. Either some scheme for keeping these elders at part-time productive work at good wages must be devised, in order that they may be self-supporting and good consumers, or the nation is likely to revert to a continuous state of low level of living plagued by a large group of dissatisfied, dependent elders.

The mere passage of old age pension laws or the development of pension, annuity or retirement schemes by industries will not solve this problem of supporting the older age groups of the future. Pension schemes that are planned on the basis of the age distribution of the present population will of course fail a few decades in the future if they have to support double or triple the percentage of elders that now exist.

Fewer Children to Depend on

Because many couples are childless now for economic reasons, and because other families are much smaller than they were a few decades ago, there will be less chance that children will take care of their parents in old age. The burden is likely to fall upon the state.

Every niche of life will feel the effects of an older population.

School buildings may be converted into homes for the aged. A decrease in the number of school children will help to relieve the school boards of the problem of obtaining adequate funds for buildings and may even allow better and more individual instruction. But there will be the problem of taking care of more elders and the school board may

find some of the plant and equipment they can not use requisitioned for that purpose.

There should be a decline in the demand for sporting goods and play equipment, except perhaps golf, unless we order our civilization so that all of us, the older people as well, have more leisure and are persuaded to use it in sports.

Since wear and tear on clothing decreases with age, the clothing stores are likely to sell less. It is the youngsters who like sporty styles and thus the call for standardized conservative modes is likely to increase.

The demand will be for apartment houses or family hotels in which the older people can live without the responsibilities of furnaces and other house cares. Thus realtors who live on development of new subdivisions will need to look for other means of livelihood.

Less food will be consumed because the older people will naturally require less than youths and they will need to pamper their digestions. Health foods and tonics will supersede some of the present demand for hotdogs and ice cream cones. This may even influence the agricultural situation.

More Sedate Amusements

Dancing and sports model autos will give way to more sedate amusements such as the talkies, radio and good books, magazines and newspapers.

The jazz party of 1930 with clink of glasses and high laughter will give way to a less lively scene. Pleasant groups will sit quietly about synthetic open fires, "reading" spoken books through their ears in order to save their tired eyes, enjoying chats with friends by long distance social telephones, sampling the radio symphonic concerts of the world.

Yet with such a picture of the older's world of 1980, it must be admitted that all the jazz of this age is not created by those under 20. Those over 60 in 1980 may be taking their second fling at youth and upset the calculations of the population prognosticators.

Science News Letter, November 11, 1933

The oriental moth, an importation from Japan which attacks fruit and shade trees, is active only at night.

New York State has given double aid to the unemployed by engaging unemployed nurses at \$17.50 a week to nurse unemployed persons ill at home.

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MEDICINE

Inflammable Ethylene Gains In Usage as Anesthetic

ETHYLENE, which has met much opposition to its use as an anesthetic, seems now to be coming into its own. One of the discoverers of its anesthetic properties, Prof. Arno B. Luckhardt of the University of Chicago, speaking at the recent Congress of Anesthetists, pointed out how its value was now being recognized by both medical scientists and patients.

A recent survey of 534 anesthetists showed that 220 of them were using ethylene, and with no explosions recorded. The danger of this anesthetic because of liability to explosion was one of the drawbacks that made it unpopular with surgeons and anesthetists. However, Prof. Luckhardt quoted statistics showing that there was but one death from it in 332,721 cases.

"It takes more skill to give gas anesthetics (be it nitrous oxide or ethylene) than ether or chloroform by the drop method," Prof. Luckhardt said. "With the same amount of skill it is easier and less fraught with danger to the patient to give ethylene than nitrous oxide since ethylene can be given with more oxygen.

"Gas Anesthesia Conscious"

"The point of particular importance, however, that I wish to make with respect to the introduction of ethylene anesthesia is this: Anesthetists and surgeons and hospital superintendents all over the country became 'gas anesthesia conscious.' The drenching of the patient with ether and even chloroform ceased in the interests chiefly of surgeon and patients. Ether anesthesia will, of course, remain some time and rightly so.

"But the era of possible and unnecessary post-operative pneumonias, ether sickness, gas pains, etc., is, or should be, over. Those who took one or the other exception to ethylene very commonly adopted nitrous oxide. The patient profited by this change of attitude towards ether and that after all is our chief concern.

"Even the explosiveness of the ethylene-oxygen mixture had a salutary effect on operating room construction and operating room practice with respect to the administration of potentially dan-

gerous anesthetics or anesthetic mixtures. The ether fires and explosions have never been given an equal share of publicity. That nitrous oxide-ether explosions occur was commonly denied. We had one here in Chicago less than a year ago and, as the irony of fate would have it, in a hospital that refused to introduce and try ethylene because of its explosive properties. In this particular instance the nurse subsequently succumbed from the burns."

Science News Letter, November 11, 1933

Vegetables packed for Byrd's Antarctic expedition have been dehydrated by a special process developed at the University of Southern California.

In birds that fly the breast bone stands out sharply like a keel, bracing the muscles that operate the wings, while the groundling ostrich has no keel.

When a 1,500 year old palace was unearthed at the ruins of Kish, in Mesopotamia, archaeologists found that it had a fine swimming pool lined with brick.

Blood transfusion was performed as early as 1667, but the importance of matching the blood was not then realized, and the treatment was so frequently fatal that the French parliament prohibited the practice.

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PHYSICS

Color Depends on Eye as Well As Wavelength, is Claim

IF THE SKY is viewed through a narrow, blackened tube its usual "blue" appears white, clouds are seen to be yellow, purple turns to pink, and a beautiful sunset becomes a mixture of tawdry colors.

This fact was mentioned by Prof. J. S. Haldane, the noted physiologist, chemist and philosopher, as an illustration of his theory of vision. He explained the theory in delivering the inaugural address to the 197th annual session of the Edinburgh Royal Medical Society.

The apparent hues of a glorious sunset are not "really there." They are an illusion created by the human eye in an attempt to make the sunset conform to the "normal" color-balance in the field of vision. The familiar blue of a clear sky is in part imposed by the eye to balance the brilliant yellow rays of the sun. What we see depends, Prof. Haldane believes, as much on the peculiar reactions of the eye to external stimuli as on the stimuli themselves.

Prof. Haldane formulated his theory as follows:

1. In the perception of either color or brightness our vision as a whole is always active; there is no merely objective cause of color or brightness.

2. In this active perception we can distinguish the coordinated maintenance of color and complementary color, as

well as brightness and darkness, in the field of vision.

If his theory be true, the assumption on which Galileo and Newton founded physics, that "our sense-organs are simply receptive of various kinds of impressions from a surrounding physical world," does not cover the facts. Newton, in his "Opticks," had assumed that the color of any light depended solely on its refrangibility, or wavelength. Prof. Haldane showed with experiments that he could make light which, by the laws of physics, ought to be yellow, turn blue, white, green or any other color, merely by changing the whole of its background.

A small area of a white screen lit by a daylight lamp appeared blue when viewed through a hole in another screen lit by a yellow lamp, and green when the front screen was lit by a red lamp. After a few moments the front screen appeared to be white, although actually it was still lit by the red lamp.

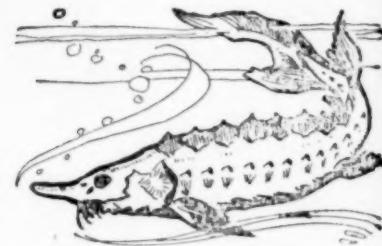
It is necessary for an object to be given the eye's whole attention if its "true" color is to be determined, Prof. Haldane explained.

Science News Letter, November 11, 1933

The principle of the Davy lamp has been applied to prevent passage of flame when gasoline tanks of airplanes are filled.



EVOLUTION



Armed Ancestors

OUR REMOTEST backboned ancestors, certain smallish fishes that lived in fresh-water streams and lakes something like half a billion years ago, wore armor to defeat the ravenous appetites of their enemies. Chief among these predators were creatures that bore a superficial resemblance to lobsters but were more nearly related to modern scorpions. Some of them were giants, six feet or more in length; they were much larger than fishes that lived in the same waters. This group of animals, extinct for many ages, have been given the name eurypterids.

The influence of these eurypterids on the evolution of fishes and hence of backboned animals generally is traced by Prof. Alfred S. Romer of the University of Chicago. A review of all available geologic data, gathered by many research workers, indicates that, contrary to earlier beliefs, fishes originated in fresh water and not in the sea, that their skeletons were bony and not merely of cartilage, and that the armored condition common among early fishes was primitive and not a later evolution from an unarmored ancestry. Even the sharks in those early days were inhabitants of fresh water, and took to the sea later on.

When Prof. Romer looked about for enemies that might have made the burden of armor a necessity for the earliest fishes, he found that the eurypterids were the most formidable aquatic beasts of prey which the fishes would be likely to fall foul of. They were the dominant life forms in fresh water when fishes first appeared, and as the fishes increased in size and number the eurypterids declined, until at last the much diminished predators may have switched roles and become the prey of the fishes.

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With the increasing independence of the fishes came also greater freedom of movement. They cast away their armor, and became free swimmers rather than mere sluggish lurkers on the dangerous bottom where the eurypterids crawled. This freedom of movement, with agility and speed the main dependence for both escape from enemies and capture of food, may have been one of the factors that started the evolution of the front end of the central nervous system into a real brain and the development of intelligence.

Prof. Romer cautions that he does not necessarily consider the perilous association of the first fishes with the hungry eurypterids as the only, or even the principal, factor in the subsequent evolution of backboned animals. Nevertheless he does think that this association played an important part in the early stages of vertebrate history.

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OCEANOGRAPHY

Swedish Oceanographer Studies Submarine Waves

GREAT wavelike disturbances far beneath the surface of the sea, that never show themselves at the top, are being studied by a noted Swedish oceanographer, Prof. Otto Pettersson. He first noticed them while he was getting data on the salt content of the waters in the Kattegat, outlet strait between the Baltic and North seas. He found that the boundary between the salt water at the bottom and the fresher Baltic water at the surface was subject to great wavelike undulations, as much as two or three yards, although the tide changes at the surface were measurable in mere inches. Since his Kattegat observations, Prof. Pettersson has found even greater submarine or internal waves, especially in partially landlocked waters. In Gullmar fjord, at the western end of the Skagerrak, they reach a height of over thirty yards.

Prof. Pettersson has found a twelve and a half hour cycle in these submarine wave movements, and also other cycles corresponding to various lunar periods. He has advanced the hypothesis that these internal waves depend on the vertical component of the moon's tide-producing force. Not all oceanographers are in agreement with him on this point, and the discussion of the cause of these internal waves is still in lively progress in scientific circles.

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•First Glances at New Books

Additional Reviews on Page 320

History of Science

CHARLES DARWIN'S DIARY OF THE VOYAGE OF H.M.S. "BEAGLE"—Edited by Nora Barlow—Macmillan, xxx+451 p., 2 folded maps, \$6.50. One of the most famous and epoch-making voyages in the whole history of science, told by the man through whom it was instrumental in revolutionizing modern biology, checked back to his original manuscript by a careful and scholarly editor. Even those fortunates who can boast a first edition of the "Beagle" Diary should have this new book on hand for purposes of comparison; for the rest of the biological world it is practically a necessity.

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Herpetology

REPTILES OF THE WORLD—Raymond L. Ditmars—Macmillan, xx+321 p., 89 pl., \$5. This new and revised edition of Dr. Ditmars' well-known book has been necessitated primarily through changes in nomenclature; the facts he told us when his book first came out are still so, though there have naturally been some additions to incorporate into the new text. Herpetologists, and zoologists generally, will welcome the new edition.

Science News Letter, November 11, 1933

Education—Psychology

THE SOCIAL BELIEFS AND ATTITUDES OF AMERICAN SCHOOL BOARD MEMBERS—Claude E. Arnett—*Emporia Gazette Press*, 235 p., \$1.75. The findings suggest that "board members are probably far more interested in instilling in the youth of the land the social inheritance of the past than they are in making any serious attempt to prepare them to meet intelligently and tolerantly the complex problems of the future." The study was made possible by the Commission on the Investigation of the Social Studies in the Schools.

Science News Letter, November 11, 1933

Archaeology—Geology

PALEOLITHIC MAN AND THE NILE VALLEY IN NUBIA AND UPPER EGYPT—K. S. Sandford and W. J. Arkell—*Univ. of Chicago Press*, 92 p., 43 pl., \$6. This is Volume II of the Oriental Institute's report on its prehistoric survey of Egypt and Western Asia. Stone implements left by Old Stone Age men along the Nile and later embedded

in the banks have been carefully studied in relation to their geologic background by the expedition. The region discussed in this volume is the 350 miles from Semnah to Luxor. Some rock drawings, perhaps the oldest found in the Nile Valley, are described.

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Botany—Zoology

PLANTS AND ANIMALS—Edited by Deette Rolf—Holt, 560 p., \$6. From Aardvark to Zinnia, this book, which is Vol. IV of Champlin's Young Folks Cyclopedia, describes thousands of animals and plants, with hundreds of good halftone illustrations. An excellent volume for the school library, or for the home bookshelf if there are growing children about.

Science News Letter, November 11, 1933

Nutrition

WHAT SHALL I EAT?—Edith M. Barber—Macmillan, 106 p., \$1.75. A practical and amusing discussion of a universal problem.

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Psychology

PSYCHO-ANALYSIS AND ITS DERIVATIVES—H. Crichon-Miller—Holt, 256 p., \$1.25. The work and theories of Freud, Jung, Adler, and Prinzhorn discussed and compared by the director of an organization where psychotherapists of all the schools are putting their theories to the daily test of practice. Although a pocket-size volume, it is printed in unusually large and readable type.

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Horticulture

ORNAMENTAL TREES—Harold Mowry—Agric. Exp. Sta., Gainesville, Fla., 136 p., free. Descriptions, well illustrated, of the principal ornamentals of value in Florida and elsewhere in the Gulf Coast region, both native and introduced. Of value both to home owners and nurserymen.

Science News Letter, November 11, 1933

Agricultural Economics

FARMERS' COOPERATIVE ASSOCIATIONS IN FLORIDA, II. ORGANIZATION AND MANAGEMENT—M. A. Brooker and H. G. Hamilton—Agr. Exp. Sta., Gainesville, Fla., 100 p., free.

Science News Letter, November 11, 1933

•First Glances at New Books

Psychology

ADOLESCENT PSYCHOLOGY—Ada Hart Arlitt—*American Book*, 250 p., \$2.25. Social conditions in our modern society have extended the dependent period of childhood to cover the years of high school, college, and professional training during which time the individual has attained to physical, physiological and mental adulthood. Marriage is delayed far beyond the time when the person is sexually mature; responsibility is withheld far beyond the time when he should be mentally and emotionally mature. The resulting conflicts and problems are legion and are discussed sympathetically in this volume intended as a college and teachers' college text.

Science News Letter, November 11, 1933

Industrial Hygiene

INDUSTRIAL HEALTH SERVICE—Leverett Dale Bristol—*Lea and Febiger*, 170 p., \$2. Simply written, concise and intensely practical is this manual on industrial hygiene. Much of it will be useful to employers and supervisors, but the worker himself can learn from it important lessons in keeping well and fit for his job.

Science News Letter, November 11, 1933

Entomology

MORPHOLOGY OF THE INSECT ABDOMEN, PART II, THE GENITAL DUCTS AND THE OVIPOSITOR—R. E. Snodgrass—*Smithsonian Inst.*, 148 p., 45c. A scholarly piece of work, of great value to advanced students and research workers in entomology.

Science News Letter, November 11, 1933

Biography

ST. ALBERT THE GREAT—Thomas M. Schwertner—*Bruce*, xxxi+375 p., \$3. If ever science adopts an official patron saint, Albert of Cologne, who began to be called "the Great" even during his own lifetime and was known also as "the Universal Doctor," should be a strong candidate for the honor. Thorough student of Aristotle, yet accepting nothing of the Stagyrite's until he had tested it himself, keen observer of natural-history phenomena and no less keen experimenter in the laboratory science of his time, he looms through the mists of the centuries as one who with infinite pains and infinite energy broke a path which we later comers have broadened and levelled into a great highway. All these aspects of Albert's

life and works are thoroughly appreciated by Dr. Schwertner, and given their proper place beside his other great qualities as teacher, philosopher, churchman and saint.

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Botany

WILD FLOWERS IN KANSAS—Frank C. Gates—*Kansas State Printing Plant*, 295 p., free. Kansas begins as prairie and ends as plain; her flowers, headed by *Helianthus*, are predominantly darlings of the sun—though her groves and streamside timber-strips shelter more than a few lovely spring mesophytes. Like all states crossed by the hundredth meridian, Kansas has hitherto suffered from a failure of "eastern" and "western" floral manuals to overlap, but now a home botanist has remedied the lack most satisfactorily. The 447 good, clear-cut line drawings of species, by Mrs. Albert Dickens, are going to be a great help to botanists making their first acquaintance with prairie and plains plants.

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Sociology

THE COMMUNITY AND SOCIETY—Loran David Osborn and Martin Henry Neumeyer—*American Book*, 468 p., \$3.50. An introductory textbook in sociology for college students.

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Entomology

A CLASSIFICATION OF NORTH AMERICAN AGALLIAN LEAF HOPPERS—P. W. Oman—*Govt. Print. Off.*, 91 p., 4 pl., 10c. A Technical Bulletin of the U. S. Department of Agriculture of interest to entomologists, especially to economic entomologists. In addition to the plates, there are 18 solid pages of line illustrations of critical diagnostic characters.

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Standards

1933 NATIONAL ELECTRICAL CODE—*International Association of Electrical Inspectors*, 304 p.

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Additional Reviews
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Archaeology-Anthropology

THE ALISHAR HUYUK, SEASONS OF 1928 AND 1929, PART II—Erich F. Schmidt—*Univ. of Chicago Press*, 148 p., 198 illus, 11 pl., \$7. With this volume, the Oriental Institute brings the history of a site in Asia Minor down to modern times. The account opens with Stratum Five, which was settled after the fall of the Hittite Empire, and the following two strata complete the archaeological history. The report is very complete, containing detailed information on ground plans, excavated objects, and burials. In an added chapter, Wilton M. Krogman discusses cranial types found at Alishar and analyzes their possible racial affinities.

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Biography

AUTOBIOGRAPHY OF A BIRD LOVER—Frank M. Chapman—*Appleton*, 420 p., \$3.75. It is a great privilege to have as a friend a man who can take you to interesting places; but there is always an offset in the irremediable fact that he cannot take you to the places where he has already been, at least to show them to you as he first saw them himself. But when such a man sits down and writes the story of his interesting life, he at least partly removes this disability; hence the high value of well-done autobiographies. Dr. Chapman, who is a true scientist and at the same time a popularizer in the best sense, has at last done us this great service. All who know him, whether personally or through his writings, will be grateful.

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Bacteriology

PATHOGENIC MICROORGANISMS—William H. Park and Anna W. Williams—*Lea and Febiger*, 867 p., \$7. The tenth edition of this classic work has been revised and considerably enlarged to include new knowledge of immunity and experience to date with active immunization against diphtheria and scarlet fever.

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